

material 80' may also be sprayed against the material 82' coating the first surface area portion 60' to form an overlap. In this embodiment, the tear seam-defining gasket 74' may be supported on the shell tool apparatus 50' during spraying of the second material 80' and removed after spraying.

The description and drawings set forth presently preferred embodiments of the invention in an illustrative manner. The description uses terminology that we intend to describe these embodiments and not to limit the scope of the invention. Obviously, it is possible to make many modifications and variations of the present invention in light of the above teachings. Therefore, within the scope of the appended claims, the invention may be practiced otherwise than as the description and drawings specifically show and describe.

We claim:

1. A skin for an automotive interior panel, the interior panel including an air bag deployment portion; the skin comprising:

a main body skin portion adapted to cover at least a portion of the automotive interior panel surrounding the air bag deployment portion of the panel, the main body skin portion comprising a first plastic material;

an air bag cover skin portion adapted to cover the air bag deployment portion of the automotive interior panel, the air bag cover skin portion comprising a second plastic material having the property of remaining substantially more ductile with decreasing temperature than the first plastic material;

a bond attaching the main body skin portion to the air bag cover skin portion; and

an air bag deployment region disposed within the air bag cover skin portion and adapted to open with the air bag deployment door in response to the force of an inflating air bag.

2. A skin for an automotive interior panel as defined in claim 1 wherein the bond includes a material selected from the group including urethane and vinyl.

3. A skin for an automotive interior panel as defined in claim 1 wherein at least a portion of the bond is a tear seam.

4. A skin for an automotive interior panel as defined in claim 2 wherein the bond includes a thermoset urethane.

5. A skin for an automotive interior panel as defined in claim 2 wherein the bond includes a thermoplastic urethane.

6. A skin for an automotive interior panel as defined in claim 2 wherein the bond includes polyvinyl chloride.

7. A skin for an automotive interior panel as defined in claim 1 wherein the bond includes a material selected from the group including olefins, esters, styrenes, and rubbers.

8. A skin for an automotive interior panel as defined in claim 1 wherein the bond is a composition including at least one of the first plastic material and the second plastic material.

9. A skin for an automotive interior panel as defined in claim 1 wherein the bond includes a composition of the first plastic material and the second plastic material.

10. A skin for an automotive interior panel as defined in claim 1 wherein the bond includes a thermoset plastic.

11. A skin for an automotive interior panel as defined in claim 1 wherein the bond includes a thermoplastic plastic.

12. A skin for an automotive interior panel as defined in claim 1 wherein the bond includes an overlap of the first plastic material and the second plastic material.

13. A skin for an automotive interior panel as defined in claim 1 wherein the air bag deployment region of the air bag cover skin portion has a back side and the air bag cover skin portion includes a tear seam defining groove in the back side.

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14. A skin for an automotive interior panel as defined in claim 1 wherein the air bag deployment region of the air bag cover skin portion includes an integral tear seam strip.

15. A skin for an automotive interior panel as defined in claim 14 wherein the tear seam strip includes a weaker plastic material having substantially less strength than the second plastic material.

16. A skin for an automotive interior panel as defined in claim 14 wherein the tear seam strip includes a material selected from the group including urethane and vinyl.

17. A skin for an automotive interior panel as defined in claim 16 wherein the tear seam strip includes a thermoset urethane.

18. A skin for an automotive interior panel as defined in claim 16 wherein the tear seam strip includes a thermoplastic urethane.

19. A skin for an automotive interior panel as defined in claim 16 wherein the tear seam strip includes polyvinyl chloride.

20. A skin for an automotive interior panel as defined in claim 14 wherein the tear seam strip includes a material selected from the group including olefins, esters, styrenes, and rubbers.

21. A skin for an automotive interior panel as defined in claim 14 wherein the tear seam strip includes a thermoplastic material containing a filler.

22. A skin for an automotive interior panel as defined in claim 14 wherein the tear seam strip includes a thermoset material containing a filler.

23. A skin for an automotive interior panel as defined in claim 1 wherein the first plastic material includes a material selected from the group including urethane and vinyl.

24. A skin for an automotive interior panel as defined in claim 23 wherein the first plastic material includes a thermoset urethane.

25. A skin for an automotive interior panel as defined in claim 23 wherein the first plastic material includes a thermoplastic urethane.

26. A skin for an automotive interior panel as defined in claim 23 wherein the first plastic material includes polyvinyl chloride.

27. A skin for an automotive interior panel as defined in claim 1 wherein the first plastic material includes a material selected from the group including olefins, esters, styrenes, and rubbers.

28. A skin for an automotive interior panel as defined in claim 1 wherein the second plastic material includes a material selected from the group including urethane and vinyl.

29. A skin for an automotive interior panel as defined in claim 28 wherein the second plastic material includes a thermoset urethane.

30. A skin for an automotive interior panel as defined in claim 28 wherein the second plastic material includes a thermoplastic urethane.

31. A skin for an automotive interior panel as defined in claim 28 wherein the second plastic material includes polyvinyl chloride.

32. A skin for an automotive interior panel as defined in claim 1 wherein the second plastic material includes a material selected from the group including olefins, esters, styrenes, and rubbers.

33. A skin for an automotive interior panel as defined in claim 1 wherein the second plastic material includes a material substantially more ductile with decreasing temperature than the first plastic material.

34. A skin for an automotive interior panel as defined in claim 1 wherein the second plastic material includes a urethane thermoset compound.

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35. A skin for an automotive interior panel as defined in claim 14 wherein a coat of paint covers an outer surface of both the skin portions and the bond and the tear seam strip.

36. A method of forming a skin for an automotive interior panel wherein the skin comprises a main body skin portion for covering most of an outer surface of the panel, and an air bag cover skin portion bordered by the main body skin portion for covering only an air bag deployment portion of the air bag cover panel, the method comprising the steps of:

forming the main body skin portion by casting a first plastic material against a first surface area of a heated shell tool to form a first plastic skin casting to the desired shape of the main body skin portion, and

forming the air bag cover skin portion by casting a second plastic material against a second surface area of the heated shell tool bounded by the first surface area to form a second plastic skin casting to the desired shape of the air bag cover skin portion, and

forming a bond attaching the main body skin portion and the air bag cover skin portion together while on the heated shell tool.

37. A method as defined in claim 36 wherein the step of forming the air bag cover skin portion includes the step of casting the air bag cover skin such that the air bag cover skin portion overlaps the first plastic skin casting.

38. A method as defined in claim 36 wherein the steps of forming the main body skin portion and forming the air bag cover skin portion are performed simultaneously by confining the second surface area from the first surface area and simultaneously casting the first and second plastic materials against the respective confined first and second surface areas.

39. A method as defined in claim 36 wherein the step of casting the main body skin portion is performed before the step of casting the air bag cover skin portion by first masking-off the second surface area of the shell tool, casting the first plastic material against the first surface area, unmasking the second surface area, then casting the second plastic material against the second surface area.

40. A method as defined in claim 36 wherein the step of forming the air bag cover skin portion includes the step of spraying plastic material on the second surface area.

41. A method as defined in claim 36 wherein the step of forming the bond includes the step of spraying a plastic

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bonding material at least between an inner edge of the first plastic skin and an outer edge of the second plastic skin that extends along and adjacent the inner edge of the first plastic skin.

5 42. A method as defined in claim 41 wherein the step of forming the bond includes the step of employing a thermoset plastic as the bonding material.

43. A method as defined in claim 42 wherein the step of forming the bond includes the step of including a urethane in the thermoset plastic bonding material.

10 44. A method as defined in claim 41 wherein the step of forming the bond includes the step of employing a thermoplastic plastic as the bonding material.

15 45. A method as defined in claim 36 wherein the step of forming a bond includes the step of melt fusing a plastic bonding material to an inner edge of the first plastic skin and an outer edge of the second plastic skin that extends along and adjacent the inner edge of the first plastic skin.

20 46. A method as defined in claim 36 wherein the step of forming a bond includes the step of melt fusing an overlap of the first plastic skin and the second plastic skin.

47. A method as defined in claim 36 further comprising the step of forming a tear seam in the air bag cover skin portion.

25 48. A method as defined in claim 47 wherein the tear seam is formed by scoring the backside of the air bag cover skin portion with a laser beam.

30 49. A method as defined in claim 47 wherein the tear seam is formed by pressing a heated impression tool into the backside of the air bag cover skin portion.

50. A method as defined in claim 47 wherein the step of forming a tear seam includes the step of casting the second plastic material about a tear seam gap-defining gasket pressed against the second surface area to form the tear seam-defining gap in the air bag cover skin portion upon gasket removal, and filling the gap with the third plastic material to form a tear seam strip in the plastic skin casting while this casting remains on the second surface area.

40 51. A method as defined in claim 47 further comprising the step of painting an outer surface of both the skin portions and the bond and the tear seam strip.

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52. A skin for an automotive panel comprising:
a main body skin portion comprising a first plastic material;
an air bag cover skin portion connected to the main body skin portion, the air bag cover skin
portion comprising a second plastic material having a glass transition temperature lower than a glass
transition temperature of the first plastic material.

53. A skin for an automotive panel as defined in claim 52 wherein the main body skin
portion and the air bag cover skin portion are connected by a bond.

54. A skin for an automotive panel as defined in claim 53 wherein the bond includes a
material selected from the group including urethane and vinyl.

55. A skin for an automotive panel as defined in claim 53 wherein at least a portion of
the bond is a tear seam.

56. A skin for an automotive panel as defined in claim 54 wherein the bond includes a
thermoset urethane.

57. A skin for an automotive panel as defined in claim 54 wherein the bond includes a
thermoplastic urethane.

58. A skin for an automotive panel as defined in claim 54 wherein the bond includes
polyvinyl chloride.

59. A skin for an automotive panel as defined in claim 53 wherein the bond includes a material selected from the group including olefins, esters, styrenes, and rubbers.

5 60. A skin for an automotive panel as defined in claim 53 wherein the bond is a composition including at least one of the first plastic material and the second plastic material.

61. A skin for an automotive panel as defined in claim 53 wherein the bond includes a composition of the first plastic material and the second plastic material.

10 62. A skin for an automotive panel as defined in claim 53 wherein the bond includes a thermoset plastic.

15 63. A skin for an automotive panel as defined in claim 53 wherein the bond includes a thermoplastic plastic.

64. A skin for an automotive panel as defined in claim 53 wherein the bond includes an overlap of the first plastic material and the second plastic material.

20 65. A skin for an automotive panel as defined in claim 52 wherein the air bag deployment region of the air bag cover skin portion includes a tear seam.

66. A skin for an automotive panel as defined in claim 52 wherein the air bag deployment region of the air bag cover skin portion includes a tear seam strip.

67. A skin for an automotive panel as defined in claim 66 wherein the tear seam strip includes a material having a lower tensile strength or a lower tear strength than the second plastic material.

68. A skin for an automotive panel as defined in claim 66 wherein the tear seam strip includes a material selected from the group including urethane and vinyl.

69. A skin for an automotive panel as defined in claim 68 wherein the tear seam strip includes a thermoset urethane.

70. A skin for an automotive panel as defined in claim 68 wherein the tear seam strip includes a thermoplastic urethane.

71. A skin for an automotive panel as defined in claim 68 wherein the tear seam strip includes polyvinyl chloride.

72. A skin for an automotive panel as defined in claim 66 wherein the tear seam strip includes a material selected from the group including olefins, esters, styrenes, and rubbers.

73. A skin for an automotive panel as defined in claim 66 wherein the tear seam strip includes a thermoplastic material containing a filler.

74. A skin for an automotive panel as defined in claim 66 wherein the tear seam strip includes a thermoset material containing a filler.

75. A skin for an automotive panel as defined in claim 52 wherein the first plastic material includes a material selected from the group including urethane and vinyl.

76. A skin for an automotive panel as defined in claim 75 wherein the first plastic material includes a thermoset urethane.

77. A skin for an automotive panel as defined in claim 75 wherein the first plastic material includes a thermoplastic urethane.

78. A skin for an automotive panel as defined in claim 75 wherein the first plastic material includes polyvinyl chloride.

79. A skin for an automotive panel as defined in claim 52 wherein the first plastic material includes a material selected from the group including olefins, esters, styrenes, and rubbers.

80. A skin for an automotive panel as defined in claim 52 wherein the second plastic material includes a material selected from the group including urethane and vinyl.

81. A skin for an automotive panel as defined in claim 80 wherein the second plastic material includes a thermoset urethane.

5 82. A skin for an automotive panel as defined in claim 80 wherein the second plastic material includes a thermoplastic urethane.

83. A skin for an automotive panel as defined in claim 80 wherein the second plastic material includes polyvinyl chloride.

10 84. A skin for an automotive panel as defined in claim 52 wherein the second plastic material includes a material selected from the group including olefins, esters, styrenes, and rubbers.

15 85. A skin for an automotive panel as defined in claim 52 wherein the second plastic material includes a material more ductile than the first plastic material.

86. A skin for an automotive panel as defined in claim 52 wherein the second plastic material includes a urethane thermoset compound.

20 87. A skin for an automotive panel as defined in claim 66 wherein a coat of paint covers an outer surface of both the skin portions and the tear seam strip.

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88. A method of forming a skin for an automotive panel, the method comprising the

steps of:

forming a main body skin portion comprising a first plastic material;

5 forming an air bag cover skin portion, the air bag cover skin portion comprising a second plastic material having a glass transition temperature lower than a glass transition temperature of the first plastic material; and

connecting the main body skin portion and air bag cover skin portion together.

10 89. A method as defined in claim 88 wherein:

the step of forming the main body skin portion comprising a first plastic material further comprises applying the first plastic material against a first surface area of a tool; and

the step of forming the air bag cover skin portion comprising a second plastic material further comprises applying the second plastic material against a second surface area of the tool.

15 90. A method as defined in claim 89 wherein:

the step of applying the first plastic material against a first surface area of a tool further comprises applying the first plastic material by casting; and

the step of applying the second plastic material against a second surface area of the tool further comprises applying the second plastic material by casting.

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91. A method as defined in claim 89 wherein the step of applying the second plastic material against a second surface area of the tool further comprises applying the second plastic material by spraying.

5 92. A method as defined in claim 88 wherein the steps of forming the main body skin portion and forming the air bag cover skin portion are performed simultaneously.

93. A method as defined in claim 88 wherein the steps of forming the main body skin portion and forming the air bag cover skin portion are performed sequentially.

10 94. A method as defined in claim 88 wherein the step of connecting the main body skin portion and the air bag cover skin portion together further comprises forming an overlap between the main body skin portion and the air bag cover skin portion.

15 95. A method as defined in claim 88 wherein the step of connecting the main body skin portion and the air bag cover skin portion together further comprises forming a bond which connects the main body skin portion and the air bag cover skin portion together.

20 96. A method as defined in claim 95 wherein the step of forming the bond includes the step of spraying a plastic bonding material at least between an inner edge of the main body skin portion and an outer edge of the air bag cover skin portion.

97. A method as defined in claim 95 wherein the step of forming the bond includes the step of employing a thermoset plastic as the bonding material.

98. A method as defined in claim 97 wherein the step of employing a thermoset plastic as the bonding material includes the step of employing a thermoset urethane as the bonding material.

99. A method as defined in claim 95 wherein the step of forming the bond includes the step of employing a thermoplastic plastic as the bonding material.

100. A method as defined in claim 95 wherein the step of forming a bond includes the step of melt fusing a plastic bonding material to an inner edge of the main body skin portion and an outer edge of the air bag cover skin portion.

101. A method as defined in claim 95 wherein the step of forming a bond includes the step of melt fusing an overlap between the main body skin portion and the air bag cover skin portion.

102. A method as defined in claim 88 further comprising the step of forming a tear seam in the air bag cover skin portion.

103. A method as defined in claim 102 wherein the tear seam is formed by scoring the backside of the air bag cover skin portion with a laser beam.

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104. A method as defined in claim 102 wherein the tear seam is formed by pressing a heated impression tool into the backside of the air bag cover skin portion.

5 105. A method as defined in claim 102 wherein the step of forming a tear seam includes the step of forming a tear seam-defining gap in the skin and filling the gap with the third plastic material to form a tear seam strip in the skin.

10 106. A method as defined in claim 105 further comprising the step of painting an outer surface of the skin.

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